

# Optoelectronic Infrastructure for RF/Optical Phased Arrays, Phase II

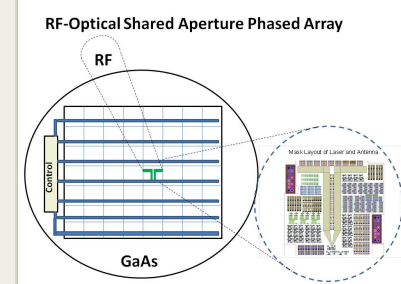
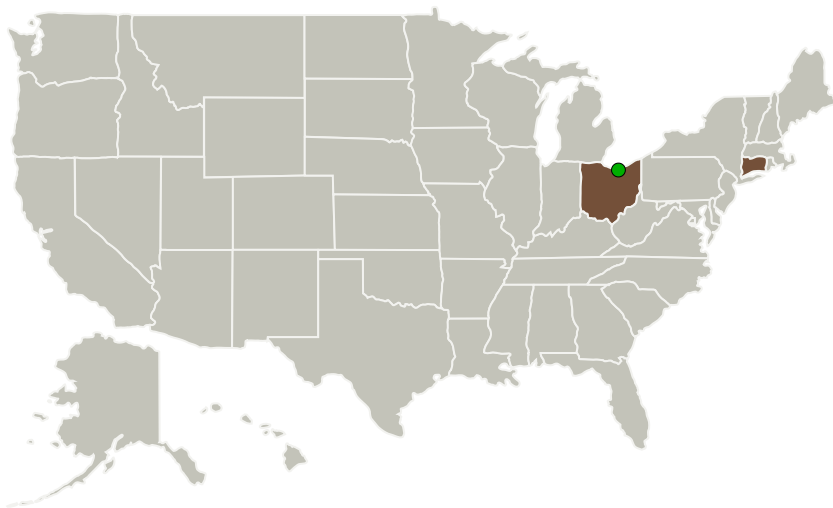
Completed Technology Project (2012 - 2014)



## Project Introduction

Optoelectronic integrated circuits offer radiation-hard solutions for satellite systems with much improved SWPB (size, weight, power and bandwidth). The phased array for sensing and data transfer is one system that optoelectronics can impact in the near term. It is known that optical delay could enable optimum beam steering electronic scanning. Lidar is another sensing system using optical beams that requires mechanical steering. In this SBIR a new integrated circuit technology is applied to the RF array with true time delay for beam steering and combined in the same physical location with an optical beam steered via current control. The integrated components required are lasers, amplifiers, modulators, detectors and optical waveguide switches. The RF at Ka band is generated by an optoelectronic oscillator and converted to RF power in a photodiode at the antenna element. The antenna element is a printed dipole on chip with optimized dimensions Ka band operation. The optical source is an array of vertical cavity lasers closely spaced and coupled by anti-guiding to enable coherent operation. Optical beam steering is achieved by controlling the current in a 2D array. In this SBIR, ODIS will develop the key components integration to produce common RF/optical aperture operation.

## Primary U.S. Work Locations and Key Partners

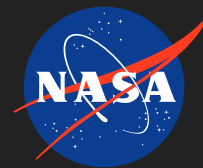


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Organizations Performing Work	Role	Type	Location
ODIS, Inc.	Lead Organization	Industry	Mansfield, Connecticut
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Connecticut	Ohio

## Project Transitions

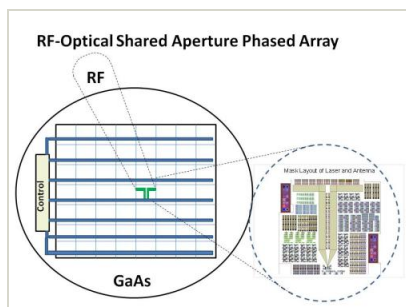
▶ **April 2012:** Project Start

✓ **April 2014:** Closed out

### Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138396>)

## Images



### Project Image

Optoelectronic Infrastructure for RF/Optical Phased Arrays  
(<https://techport.nasa.gov/image/126475>)

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Organization:

ODIS, Inc.

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

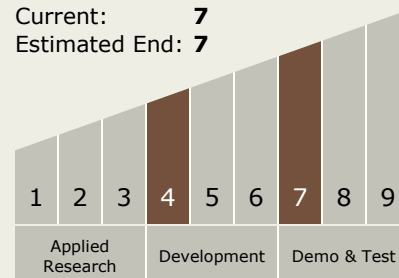
Carlos Torrez

### Principal Investigator:

Jianhong Cai

## Technology Maturity (TRL)

Start: 4  
Current: 7  
Estimated End: 7



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## Technology Areas

### Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - └ TX05.5 Revolutionary Communications Technologies
    - └ TX05.5.3 Hybrid Radio and Optical Technologies

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System